

stands rejected under 35 U.S.C. § 103 for being unpatentable over the Fall 1993 issue of *LaserPulse* as applied to claims 1-10, 12, 24, 25, 28, and 29 above, and further in view of U.S. Patent No. 4,761,786 to Baer. Claims 13, 15, 26, 27, and 30 stand rejected under 35 U.S.C. § 103 for being unpatentable over the Fall 1993 issue of *LaserPulse* as applied to claims 1-10, 12, 24, and 25 above, and further in view of U.S. Patent No. 4,894,115 to Eichelberger et al. Claims 16 and 17 stand rejected under 35 U.S.C. § 103 for being unpatentable over the Fall 1993 issue of *LaserPulse* in view of Eichelberger as applied to claims 13, 15, 26 and 27 above, and further in view of U.S. Patent 3,931,458 to Dini. Claim 23 stands rejected under 35 U.S.C. § 103 for being unpatentable over the *LaserPulse* reference. Claim 22 stands objected to for being dependent on a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim. Applicants respond to these rejections as follows.

All of the rejections rely on the prior art effect of the *LaserPulse* publication. As noted in applicant's response to the previous Office action, the *LaserPulse* publication and the 4420 brochure were published within one year of the U.S. filing date, so the applicant submitted a declaration stating that he wrote the relevant portion of the reference. However, an inventor was added to the application.

The Examiner states that the declaration is not persuasive because Mr. Owen does not state that he "invented" the relevant subject matter disclosed in the *LaserPulse* publication. The Examiner further contends that the declaration is deficient because it omits any reference to contributions by the added inventor, Mr. James N. O'Brien.

Accordingly, applicants submit herewith a Substitute Declaration of Mark D. Owen Concerning Authorship. The substitute declaration confirms the inventive roles of Mr. Owen and Mr. O'Brien with respect to

the via drilling disclosure provided in both the *LaserPulse* publication and the 4420 brochure.

Applicants believe that the declaration should effectively remove the *LaserPulse* publication as prior art. The removal of this publication overcomes the § 102(a) rejection and undermines the combinations of references supporting the obviousness rejections.

Applicants thank the Examiner for the courtesies rendered during the recent telephone conferences concerning the declaration. The Examiner indicated that he would accept the substitute declaration.

With regard to the Examiner's expressed potential rejection of certain claims over Inagawa et al., applicants have amended claim 1 to recite that the output pulses are generated by a non-excimer laser at a repetition rate greater than about 1 kHz. Support for this amendment is found in the discussion of the disadvantages of excimer lasers on page 19, line 54 through page 20, line 30, in claim 12, and elsewhere in the specification. The specification also provides working examples of solid-state lasers. Applicants believe that amended claim 1 is nonobvious and not a mere design choice. Inagawa et al. employ an excimer laser ($\text{KrF}:\lambda = 248 \text{ nm}$) or CO_2 laser ($\lambda = 10.6 \mu\text{m}$) to form a hole in a printed circuit board (TLC-W-551, made by Toshiba). These laser systems cannot practically achieve spot size or laser fluence equivalent parameters set forth in the present invention. Furthermore, the repetition rate of an excimer focused to a small spot area would be too slow to use in a manufacturing process, and the wavelength of the CO_2 laser does not fall within the claimed wavelength range. Added dependent claim 31 recites some of these and other distinctions. Support for claim 31 is found in claims 9 and 12 and in the examples in the specification.

Applicants have added claim 32 to specify certain subcombinations of dual layer processing. Claim 32 recites processing at least two of three

layers where one layer is an inorganic reinforcement material, one layer is a metal or combination of metals, and one layer is an organic dielectric material with or without organic reinforcement material incorporated therein. Support for this set of subcombinations is found in Example 6, where an aramid organic reinforcement and copper are processed, and Example 5, where an inorganic glass fiber, used to reinforce an organic cyanate ester dielectric, is processed.

New independent claim 33 is similar to dependent claim 22 to which the Examiner objected, but indicated would be allowable. New claims 34-36 are dependent on claim 33.

The subject matter of the new claims is encompassed within the scope of the original claims and should, therefore, not raise new issues that would require further searching.

Applicants believe their application is now in condition for allowance and respectfully request the same.

Respectfully submitted,

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